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ALLEGHENY FOREST EXPERIMENT STATION*

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Frost and Rabbits as Well as Deer Destroy Tree Seedlings

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Large areas of poorly stocked forest land in Western Pennsylvania are believed to be held in this unsatisfactory condition by overbrowsing by deer. To determine to what extent smaller animals might also contribute to failure of tree seedling development, the Allegheny Forest Experiment Station established in 1934 exclosures fenced against deer, and against both deer and rabbits, in four timber stands on the Allegheny National Forest. Each exclosure had its corresponding unfenced control. Tree seedlings and sprouts were carefully counted in 1936 and again in 1941. The changes in density caused by treatments in the four stands are shown below.

Type of stand	Location	Density of undergrowth in 1936, stems per acre	Change in Undergrowth Density, 1941 — Treatment: Fenced against deer	Unfenced	Fenced against deer and rabbits	Unfenced
		Number	Percent	Percent	Percent	Percent
Old growth	Plateau	5,240	+ 58	+ 60	+ 55	+ 121
Poorly stocked 15-year age class	Frost pocket	955	+ 9	- 15	- 8	- 17
Well stocked 45-year age class	Plateau	897	+ 13	+ 36	+305	+ 33
Well stocked 45-year age class	North-facing lower slope	492	+ 4	- 51	+232	- 23

In the old growth timber where tree seedlings were originally abundant, density increased irrespective of fencing. In the frost pocket density declined, but to a less extent inside than outside the fences. In the first case browsing did not prevent an increase in seedlings; and in the second, exclusion of browsing animals did not ensure satisfactory restocking.

* In cooperation with the University of Pennsylvania, Philadelphia, Pa.

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Of more interest are the results in 45-year old second growth. In both stands fencing against deer caused an insignificant increase in seedling abundance, but fencing against both deer and rabbits caused a very important increase. A very striking difference in character of the shrubs and herbs was also evident on the lower slope. Here ferns were dominant outside the fence, whereas blackberry, hobblebush and tree seedlings were dominant within the deer and rabbit proof fence.

It is evident, therefore, that rabbits and frost play a very significant part in destroying tree seedlings. The experiment does not tell us how much damage deer alone did, since no exclosure admitted deer but not rabbits. It is safe to state, however, that deer should not be blamed exclusively for damage to tree seedlings unless it is certain that rabbits are not also involved.